

Remarks/Arguments:

By this Amendment, Applicants have amended claims 1 and 37, and added new claim 44. Claims 1 and 29-44 are pending.

Clarification Requested

Page 2 of the Office Action has at its center the title "Rejections - 35 USC § 103." But the Office Action goes on at page 4, paragraph 4 to reject claims 1, 29-35, and 37-42 under 35 U.S.C. § 102(b) as "being anticipated by PCT/US97/07233 in view of Stefansky (U.S. 6,222,706)." Applicants would appreciate clarification on this point, as it appears that this is a typographical error and that the Examiner intended to reject these claims under Section 103(a). However, clarification is requested.

Claim Rejections Under Section 103

Claims 1, 29-35, and 37-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over PCT/US97/07233 in view of Stefansky. By this Amendment, Applicants respectfully traverse the Section 103(a) rejection.

Claims 1 and 37 are independent claims. Claims 29-36 depend on claim 1, and claims 38-43 depend on claim 37.

Turning first to independent claim 1, it is directed to a head support mechanism including the following features:

- a slider having a head attached thereto, for recording data to and/or reproducing data from a disk;
- a slider holding plate for holding the slider,
- a pair of substrates each having a piezoelectric element attached thereto,
- elastic hinges for connecting the slider holding plate and the pair of substrates, and
- a dimple for supporting the slider holding plate such that the slider holding plate is rotated on the dimple in a pitch direction, a roll direction, and a yaw direction,
- **wherein the slider is rotated in a yaw direction on the dimple as a center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements.**

Applicants respectfully submit that the head support mechanism defined by claim 1, as well as the claims dependent thereon, is patentably distinguished from the PCT Reference and the Stefansky Patent at least based on the feature of the slider being rotated in the yaw direction on the dimple as a center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements. This feature is hereinafter generally referred to as the "Center Feature" of Applicants' claimed invention. Applicants submit that the Center Feature is neither taught nor suggested in the references of record.

The amendment of claim 1 to include the Center Feature is not the addition of new matter but is based on the application as originally filed. Support for this amendment is found throughout the specification; for example, see page 25, lines 7-16, and page 31, lines 18-31. The basis for Applicants' amendment is to more clearly clarify that the dimple is the center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements.

An advantage of the Center Feature is that the inertia of a portion rotated in the yaw direction by contraction and/or expansion of at least one of the piezoelectric elements can be smaller than that taught by the prior art, including these cited references. In other words, as a result of this Amendment, Applicants have more clearly indicated that the slider is shorter in radius from the center axis to the top of the head. Therefore, the response to high frequency is improved over that which has been taught by the prior art. The slider of Applicants' claimed invention can be quickly rotated even if the piezoelectric element is contracted and/or expanded at a high frequency by applying a high frequency AC voltage and the resonant frequency of the slider in the yaw direction caused by contraction and/or expansion of the piezoelectric element is increased. Because of these advantages, the phase delay of the rotation of the slider in the yaw direction is improved in Applicants' claimed invention. The foregoing advantages are neither found or considered by the references of record.

By pointing out in the amendment to claim 1 that the dimple is the center of rotation, Applicants' invention further indicates that only one point serves as the center of rotation of the slider holding plate for the three directions. Therefore, the friction between the slider holding plate and the dimple is reduced, so that the head can be displaced by a large amount even for a small rotational force.

The Center Feature and the advantages associated with such Feature are neither taught nor suggested in the PCT Reference.

The PCT Reference in general refers to a flexure microactuator. The Examiner, at page 4 of the Office Action, admits that the PCT Reference does not teach the dimple supporting the slider holding plate such that the slider holding plate is rotated on the dimple in a pitch, roll, and yaw direction. Applicants further submit that the PCT Reference does not teach or suggest Applicants' further feature that the slider is rotated in the yaw direction on the dimple as a

center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements as required by Applicants' claim 1. These deficiencies of the PCT Reference are neither taught nor suggested by the Stefansky Patent.

The Stefansky Patent in general refers to a mechanism to position a transducing bead with respect to a selected radial track of a rotatable recording disc in a disk drive including a actuator arm and a suspension load beam connected to the actuator arm. A plate is hingedly attached to the load beam, and the flexure is attached to the plate. A slider supporting the transducing head is attached to the flexure. A microactuator is attached to the plate and is operable in response to electrical control signals to move the plate relative to the load beam in the general plane of the load beam to selectively position the transducing head proximate to the selected radial track on the rotatable recording disc.

The Office Action focuses on the Stefansky microactuator as shown in Figures 1-3 and 9, and goes on to make the following statement:

Stefansky '706 discloses a magnetic head arm assembly having a load beam (18), slider (24) with a head (40) attached thereto, a slider holding plate (22) with a dimple (60) supporting the slider holding plate such that the slider holding plate [22] (at its tongue portion (27)) is rotated on the dimple [60] in a pitch, roll and yaw direction. See Figure 9 of Stefansky.

(Page 4 of the Office Action). From this description of the Stefansky Patent and from Applicants' understanding of the Stefansky Patent, there is simply no teaching or suggestion of the requirement of Applicants' claim 1 of the slider being rotated in the yaw direction on the dimple as a center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements. In other words, the Stefansky Patent neither teaches nor suggests the Center Feature of Applicants' claimed invention.

According to the Examiner the "dimple" in the Stefansky Patent is the "load point 60" and the slider is rotated about this load point 60 in the yaw direction by contraction and/or expansion of at least one piezoelectric element. But according to the Stefansky Patent, the slider 24 is rotated in the yaw direction (arrow 64 as shown in Figure 2) by rotation about aperture 56. There is no rotation about the load point 60 in the yaw direction. In other words, there is a lack of the Center Feature of Applicants' claimed invention. More specifically, the Stefansky Patent identifies numeral "60" as being a "load point" and not a point of rotation. According to the Stefansky Patent, at column 3, lines 42-46, "Load beam 18 applies a load to slider 24 through lever plate 42 and tongue 27 of flexure 22 at load point 60, ensuring that head 40 is maintained in close proximity with the surface of the disk 30." (Emphasis added).

Thus the load point 60 is provided to keep the head 40 in close proximity to the disk 30, and not as a point of rotation. Again, Applicants point out that there is simply no dimple as the center of rotation in the Stefansky Patent as required by Applicants' amended claim 1, as well as the claims dependent thereon.

The Stefansky Patent goes on to describe the operation of the flexure microactuator at column 3, line 47 to column 4, line 2. According to this identified portion of the Stefansky Patent, with respect to Figures 2 and 3, the slider 24 and head 40 operate in the yaw direction (arrow 64) according to the following interaction of various elements. A voltage is applied to piezoelectric element 44 by two leads to selectively cause expansion or contraction of the element. Tab 48 of load beam 18 is fixed while tab 46 of lever plate 42 is movable, so that expansion and contraction of piezoelectric element 44 results in movement of tab 46 in the direction indicated by arrows 62 (Figure 2). This linear movement of tab 46 of lever plate 42 is translated into arcuate rotational motion by the arrangement of hinges 52 of load beam 18. A linear force on tab 46 in the direction of arrows 62 forces hinges 52 to distort the beam, because of the connection between lever plate 42 and load beam 18 at aperture 56. The distortion of hinges 52 causes lever plate 42 and flexure 22 to rotate on the axis of aperture 56, resulting in arcuate displacement of transducing head 40 at the trailing edge of slider 24 in the direction indicated by arrows 64, in the general plane of the load beam 18. Thus there is simply no teaching or suggestion of the feature of Applicants' claimed invention of the slider being rotated in the yaw direction on the dimple as a center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements as set forth in Applicants' claim 1.

Based on the foregoing remarks, it is apparent that the Stefansky Patent, and the PCT Reference (by admission of the Examiner) does not teach or suggest the Center Feature of Applicants' claimed invention and its associated advantages. Lacking this feature, the PCT Reference and the Stefansky Patent either alone or in combination neither anticipate nor render obvious claim 1, as well as the claims dependent thereon.

Claim 37 is also directed to a head support mechanism and also includes the Center Feature of Applicants' claimed invention. Thus claim 37 and the claims dependent thereon are likewise patentably distinguished from these references of record.

Based on the foregoing remarks, Applicants respectfully submit that the rejection of claims 1, 29-35, and 37-42 based on the PCT Reference and Stefansky Patent be withdrawn.

Claims 36 and 43 stand rejected under 35 U.S.C. Section 103(a) as being unpatentable over the PCT Reference in view of the Stefansky Patent and further in view of Crane. By this Amendment, Applicants respectfully traverse this Section 103(a) rejection.

Claim 36 is directly dependent on claim 1 and claim 43 is directly dependent on claim 37. Thus both of these dependent claims include the Center Feature and for the reasons noted above are patentably distinguished from the PCT Reference and the Stefansky Patent. It is Applicants' contention that the Crane Patent does not rectify the deficiencies heretofore discussed with respect to the PCT Reference and Stefansky Patent.

The Crane Patent has only been cited with respect to dependent claims 36 and 43. The Crane Patent in general refers to a microactuator suspension and has principally been identified with respect to a conductor pattern. But nowhere in the Crane Patent is there any teaching or suggestion of a slider that is rotated in the yaw direction on the dimple as a center of the rotation by contraction and/or expansion of at least one of the piezoelectric elements as defined in Applicants' claimed invention. In other words, the Crane Patent also lacks any teaching or suggestion of the Center Feature of Applicants' claimed invention. Lacking the Center Feature of Applicants' claimed invention, Applicants submit that the combination of the PCT Reference, the Stefansky Patent, and the Crane Patent neither teaches nor suggests the head support mechanism defined by Applicants' claimed invention. Applicants therefore request that the rejection of claims 36 and 43 be withdrawn.

Newly Added Claim

By this Amendment, Applicants add a new independent claim 44 which is directed to a head support mechanism. Among the features of new claim 44 is the following:

- the slider is rotated in the yaw direction on the dimple around an axis drawn through the center of the dimple normal to the load beam.

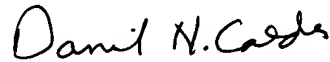
It is Applicants position that this feature defined in claim 44 is in a similar manner comparable to the Center Feature and for the reasons noted above claim 44 is patentably distinguished from the references of record.

Appln. No.: 09/774,347
Amendment Dated January 31, 2005
Reply to Office Action of November 18, 2004

YAO-4337US

In view of the foregoing remarks and amendments, Applicants respectfully submit that claims 1 and 29-44 are in condition for allowance. Reconsideration and allowance of all pending claims are respectfully requested.

Respectfully submitted,



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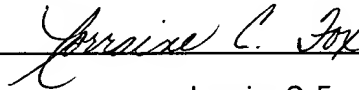
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Dated: January 31, 2005

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